

WHAT IS CLAIMED IS:

1. An exhaust apparatus for a process apparatus processes an object to be processed using a process gas and has an exhaust port, comprising:

5 an exhaust pipe to be connected to said exhaust port of said process apparatus;

a trap mechanism connected to said exhaust pipe, for removing an impurity gas contained in an exhaust gas from said process apparatus;

10 a reaction-gas supply mechanism provided in said trap mechanism or in said exhaust pipe at an upstream of said trap mechanism, for feeding a reaction gas which is reacted with said impurity gas in at least one of said trap mechanism and said exhaust pipe to lower a  
15 vapor pressure of the impurity gas; and

an exhaust-gas discharging mechanism provided in said exhaust pipe at a downstream of said trap mechanism, for discharging said exhaust gas from said process apparatus outside via said exhaust pipe.

20 2. The exhaust apparatus according to claim 1, wherein said reaction-gas feeding mechanism is provided in a portion of said exhaust pipe in a vicinity of said exhaust port of said process apparatus, and said reaction gas is fed into said portion.

25 3. The exhaust apparatus according to claim 1, wherein said reaction-gas supply mechanism has an injection nozzle for feeding said reaction gas into one

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4. The exhaust apparatus according to claim 1, wherein said process gas is one of a titanium-containing gas, tungsten-containing gas, tantalum-containing gas and silicon-containing gas.

6. The exhaust apparatus according to claim 1, wherein a feeding amount of said reaction gas is set in such a way that all of a non-reacted gas in said impurity gas is converted to a complex with the lower vapor pressure.

~~8. An impurity-gas removing method of removing an impurity gas contained in an exhaust gas to be discharged from a process apparatus for processing an object to be processed using a process gas, comprising:~~

a step of mixing a reaction gas which is likely to react with said impurity gas in such a way as to lower

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a vapor pressure of said impurity gas into said exhaust gas, thus yielding a reaction by-product, and trapping said reaction by-product using a trap mechanism.

9. An exhaust apparatus for a process apparatus with an exhaust port for processing an object to be processed using a process, comprising:

an exhaust pipe to be connected to said exhaust port of said process apparatus;

a trap mechanism disposed in said exhaust pipe, for removing an impurity gas contained in an exhaust gas from said process apparatus as a reaction by-product; and

oxidative-gas supply mechanism provided in said trap mechanism or a portion of said exhaust pipe at an upstream of said trap mechanism, for feeding an oxidative gas for reacting with and oxidizing a reaction by-product in said trap mechanism.

10. The exhaust apparatus according to claim 9, further comprising a bypass pipe connected to a portion of said exhaust pipe at a downstream of said trap mechanism and to said process apparatus in such a way as to bypass said trap mechanism.

11. The exhaust apparatus according to claim 10, wherein said exhaust pipe has a first valve provided between said trap mechanism and said process apparatus and a second valve disposed in said bypass pipe, in which said first valve is kept open and said second

12. An impurity-gas removing method of removing,  
5 as a reaction by-product, an impurity gas contained in  
an exhaust gas to be discharged from a process  
apparatus for performing film deposition on an object  
to be processed using a process gas, with a trap  
mechanism, causing an oxidative gas to contact said  
0 reaction by-product to oxidize said reaction by-product,  
thereby stabilizing said reaction by-product.

13. The impurity-gas removing method according to claim 12, wherein when said oxidative gas is made to contact said reaction by-product in said trap mechanism, said process apparatus is evacuated with a large inverse diffusion coefficient via an exhaust bypass pipe so provided as to bypass said trap mechanism.

14. The impurity-gas removing method according to claim 12, wherein stabilizing of said reaction by-product sequentially and repeatedly is performed by trapping said oxidative gas at a pressure higher than that needed at a time of evacuating said trap mechanism and then exhausting said trapped oxidative gas plural times.

15. The impurity-gas removing method according to claim 12, wherein said reaction by-product is a product produced as a cleaning gas reacts with a by-product of

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a mechanism provided in said exhaust pipe at a downstream of said trap mechanism, for discharging an exhaust gas from said process apparatus via said exhaust pipe; and

a connecting mechanism for allowing said trap

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$$\begin{aligned} & \left\{ \frac{\partial^2}{\partial x_i^2} + \frac{\partial^2}{\partial y_j^2} - \frac{\partial^2}{\partial z_k^2} \right\} f(x,y,z) = \\ & \sum_{i,j,k=0}^\infty \left( \frac{\partial^2}{\partial x_i^2} + \frac{\partial^2}{\partial y_j^2} - \frac{\partial^2}{\partial z_k^2} \right) f(x,y,z) = \end{aligned}$$